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**CONTRIBUTIONS TO GENERAL ETIOLOGY AND
PATHOLOGY OF THE INSANE.**

BY DR. ALES HRDLICKA.

- I. Etiological relation of tuberculosis to insanity.
- II. Disorders of smell in the insane.
- III. Reflexes in the insane.
- IV. Investigations as to color-blindness and some psychological phenomena in the insane.

I. ETIOLOGICAL RELATION OF TUBERCULOSIS TO INSANITY.

That tuberculosis bears *some* relation to insanity, and vice versa, has been recognized by all those who ever gave this subject attention; that the first disease could stand in any *etiological relation* to the second has been largely overlooked or but superficially considered. The physician of the insane saw his patients die three to five times as often from tuberculosis as the sane people, and generally concluded that disease of the mind predisposes its victims to the consumption, prepares them for it, without recognizing that such conditions are only too liable, as causes, to be reciprocal.

That it is only the *predisposition* that insanity in time induces, is self-evident from our knowledge of the real originators of tuberculosis, as well as from experience, which shows us that the mortality from it in the modern asylums can be reduced to and below the general outside average. In the Middletown State Hospital, where all the following investigations have been conducted, among 1,100 insane patients, there have been but three deaths from tuberculosis within the past year. During this time I have had the opportunity to become acquainted with every one of the deceased before the *exitus lethalis*, and with the majority of them at the autopsy table later, so that an under-estimate of that cause is quite improbable. The year before (October, 1893, to October, 1894) tuberculosis of some sort as one of the causes of death is registered in seven; at present (August, 1895) there are no more, but four or five cases with consolidation, for the most part chronic, of the apices, with no one of the patients presenting any other signs of consumption. Such is the practical result obtained by favorable climatic conditions of the hospital and strict hygiene, and it is only natural for it to be such; nevertheless, I have no doubt whatever but that the

presented by the author

predisposition to phthisis exists among the inmates in this, as in any like institution, waiting only for the up to now here fortunately checked contagion. To the interpretation of this "predisposition" we will return somewhat later.

One of the first observers to point out to some relation between these two diseases was McKinnon, who, as early as 1845, stated his conviction that "the scrofulous and insane constitutions are nearly allied"; and that "lung phthisis appears especially to stand in close connection with insanity." Landsberg (*Mania und Lungensucht*, *Rust's Magazine*, No. 64) believed that "insanity is often a result of phthisical dyscrasia." Hagen (*Allg. Zeitschr. f. Psych.*, Vol. 7) expresses in his statistical data and article, that "insane are five times as subject to tuberculosis as sane," and also that in the tuberculous insanity it is five times as frequent as in the non-tuberculous. "Tuberculosis may be both a causative or modifying cause of insanity" (Skae, *Regis*, Van der Kolk, Ball); and in a similar sense speaks Morel in his *Psychiatrie* (1860).

Of contemporary authors it is Clouston who has given the greatest attention to the relations of phthisis with insanity, and he quotes, in his article on phthisical insanity in Tuke's *Dict. of Psych. Med.*, the following: "Perhaps two-thirds, or even more, of idiots and imbeciles are of scrofulous constitution" (*Ireland: Idiocy and Imbecility*).

Van der Kolk (*Mental Diseases*): "It is remarkable that in the very same family some of the children suffer from mania or melancholia, and the brothers and sisters, who have remained free from these diseases, die of phthisis."

Guislain (*Lecons orales sur les Phrenopathies*): "Pulmonary tuberculosis appears to me to be in direct relationship with insanity; it is frequently seen in the descendants of the insane and in their progenitors."

Dr. James quotes Thompson as showing that, as to heredity, the two diseases are similar in the following respects: "1. Transmission is from either parent. 2. The disease may appear in the child before it is developed in the parent. 3. The disease may be transmitted by the parent without development in himself. 4. Atavism is a frequent and important characteristic." To which Clouston adds: "5. 'The age at which the two diseases are most commonly developed is somewhat the same.'" Clouston believes the greatest risk of insanity is where both phthisis and insanity existed in the same family, more so than when either was alone. In his *Text*

Book on Insanity this same author speaks thus: "It is surprising how often both diseases, phthisis and insanity, occur in different members of the same family. They are too frequent to be a mere coincidence. The constitutional weakness which tends to end in phthisis is, I have no doubt, akin in some degree, under some conditions, to that which tends to end in insanity."

All these propositions seem clear, absolute, and the etiological relation of tuberculosis to insanity would appear by them established. And still, strange to say, however positive and clear to the point the majority of these statements seem to be, and although the very words used seem to speak for it, yet the etiological bearing of tuberculosis on insanity is by no means universally recognized. Almost all the authors of these statements neglect their own words and turn them to proof of the only fact seemingly apparent: Insanity leading to phthisical dyscrasia and thus more or less directly to the large percentage of deaths of this disease in the asylums. Some of the first statements on this matter, as for instance that of Landsberg, were ventured so early in the days of psychiatry that they are but mere indications of the lucid future. But with the late observers it seems a kind of unexplainable oversight not to have given a fact apparently important and intuitively observed their more extended and thorough attention. Take, for example, Clouston. He will clear points of resemblance of the two diseases; he will recognize their mixed occurrence in the same families, and the consequently arising greater gravity of both disorders; he goes even farther and expresses directly his conviction of them being akin in some form and degree one to the other; and, as the only consequence, he tries to establish a new form of insanity, the one with which tuberculosis, the developed disease already, is directly associated—the phthisical insanity, so-called; he has no word for the phthisical dyscrasia. And similarly, all the others.*

At such a state of things it is undoubtedly necessary to look into the subject a little closer. The most direct way to determine a point of this kind is by statistical investigation; but, before we have recourse to any statistics, let us see clearly what is really disease of mind and what is consumption.

* Since this was written, two American papers, bearing to a certain extent on this question, appeared: one on "Phthisis and the Neurotic Element," by Dr. Mays, and the other on "Phthisis and Insanity," by Dr. H. C. Tomlinson, both referred to in *N. Y. Med. Journal*, No. 859.

Tuberculosis, taken abstractly, is both a cause and a result of a certain general or constitutional, but especially pulmonary, weakness, and this weakness, which may be transmitted from parents to the progeny and take distinct shades in different individuals, we call dyscrasia phthisica. What is really a dyscrasia? The cells of the normal system have the power acquired during evolution of resisting the more common harmful influences, a self-preservative power, or a power of resistance. This power is compound. And again, there is a general resistance, or that common to all the cells of the body, and there is the resistance of each individual group of cells or that of the various organs. Being an established function of all the cells, such a resistance must have its representation in the nervous centers, as all stable conditions or properties of the cells have, and these nervous areas must be, besides appreciative: (1) Active or reactive, and (2) related directly with other parts of the central nervous system; and, all other functions being related more or less with the entire central nervous system, this must by analogy be the same. These are not theories, for we can prove them by many examples. All changes of the function, its centers, or their connections, must necessarily correspond and be directly proportionate to each other. Perfect centers will keep up perfect resistance; imperfect resistance, if of sufficient duration, will affect correspondingly its centers, and these the nervous entity. A temporarily diminished resistance of an organ is, according to its kind, its respective weakness. Permanent diminution of some form of resistance of a group of cells is a corresponding form of dyscrasia. Dyscrasia, defined, is a permanent, inherited, or acquired defect of some form of natural resistance of one or more groups of cells of the human body. Phthisical dyscrasia is a loss of that form of resistance of the body, and especially of the lungs, which, when present, hinders a man from acquiring tuberculosis. Insanity is a result of various extensive disorders of the brain, an organ that at once is an organ of appreciation of all conditions of the body, and an organ that more or less directly controls every part of the body. Now let any constitutional weakness, tuberculous or other, become established through long-continued outward causes, and, before the specific disease of the dyscrasia sets in, what have you found, but that the brain, really the trophic, sustaining, reactive center, is weakened correspondingly? In other words, how will you explain "dyscrasia" but as resting on a nervous basis? Now, a nervous, a brain weakness

of any kind, any extent, is a disorder; insanity is due to a brain disorder, and how far have we from one to the other? Every dyscrasia is, in a strict sense, besides the condition of the nervous system in general, a mild form of mental alienation; and as such, can it be other than one of the predisposing causes of the graver general brain disorders, the graver forms of mental alienation—the insanities?

Thus, and thus only, wish I my words to be understood. I do not believe, with all the apparent facts I have, tuberculosis to be a cause of insanity, no more than I believe rheumatism or paludism to be such, but I will maintain, as the result of my investigation, that the results of tuberculosis in any of their forms—in other words tuberculous dyscrasia of any kind—is, just as any other dyscrasia, the gouty, syphilitic, rachitic, etc., one of the causes of disease of the mind, or insanity.

Looking through psychological literature, I find I am not entirely isolated in the substance of these opinions, a fact which gives me much confidence in their veracity. According to Ball, insanity is “not a malady that commences, but one that finishes.” (*Lec. sur les Mal. Ment.*, p. 34.) Speaking of the heredity of insanity, C. Mercier (*Tuke's Dict. of Psych. Med.*) says: “Much more important is the fact, far too insufficiently recognized, that the factor that is directly inherited is not insanity, but an instability or disordered arrangement of nervous tissue, which allows insanity to occur; and that we must look for the heritable antecedents of insanity not alone in insanity itself, as existing in progenitors, but in all maladies which display evidence of undue instability or disorder of the highest nervous arrangements.” And Krafft-Ebing (*Psychiatria*, '93, p. 170) says: “There is no doubt that all that weakens the nervous system and the propagative powers of a person leads to neuropathic constitution, and thereby to all possible nervous disorders of the progeny.” “A person does not inherit insanity, but a tendency or predisposition to it. The tendency is inherited from the stock, not merely from the immediate relations. A predisposition to insanity is not the heritage of something definite and known, passing from one generation to another in a definite and constant way, but rather of an uncertain bundle of obscure tendencies, which break up into various distributions.” (*Maudsley: Pathology of Mind*, '95.) And again Maudsley, in the same work and edition: “It is not the insane variation that is inherited, but a native fault or flaw in the germ-plasm of the stock.”

Thus supported, even though the citations were not written by their respective authors with the same points in view, I shall no more hesitate to assert tuberculous dyscrasia as one of the predisposing causes of insanity, and that of insanity in general, and will proceed to the direct statements which are to prove the proposition.

My investigation consisted of inquiries among insane, which I have employed all the means in my power to render reliable. The cases of tuberculosis in the families of the patients examined were divided into *near* (which comprise the parents, grandparents, brothers and sisters, and parents' brothers and sisters) and *distant*, or all other relatives beyond those named up to second cousins. Of the "near," I have specially extracted yet those of parents. The two hundred of each sex examined comprise the following mental disorders: Mania: acute, recurrent, and chronic; melancholia: acute and chronic; paranoia, epileptic insanity, general paresis, imbecility, terminal dementia, and a few miscellaneous cases. The respective numbers examined were:

	Men.	Women.		Men.	Women.
Mania, acute.....	8	7	Epileptic insanity.....	18	7
" recurrent.....	2	13	General paresis.....	5	..
" chronic.....	35	22	Imbecility.....	11	5
Melancholia, acute.....	14	17	Dementia, terminal.....	50	25
" chronic.....	17	34	Miscellaneous.....	20	14
Paranoia.....	20	56			

The results, given in percentage, are as follows:

	Men.	Women.		Men.	Women.
MANIA ACUTA:			MELANCHOLIA ACUTA — Continued.		
Tuberculosis in family:			Tuberculosis in family:		
Near.....	25 %	71 %	Absent.....	21.5 %	12 %
Parents.....	..	..	Doubtful.....	35.5	18 "
Distant.....	14 "	14 "	MELANCHOLIA CHRONICA:		
Absent.....	25 "	14 "	Tuberculosis in family:		
Doubtful.....	50 "	..	Near.....	47 "	44 "
MANIA RECURRENT:			Parents.....	18 "	9 "
Tuberculosis in family:			Distant.....	..	9 "
Near.....	50 "	53.5	Absent.....	29 "	20 "
Parents.....	..	23.5	Doubtful.....	23 "	26 "
Distant.....	..	15.5	PARANOIA:		
Absent.....	50 "	7.5	Tuberculosis in family:		
Doubtful.....	..	23.5	Near.....	30 "	43 "
MANIA CHRONICA:			Parents.....	5 "	16 "
Tuberculosis in family:			Distant.....	..	4 "
Near.....	34 "	43 "	Absent.....	30 "	22 "
Parents.....	9 "	19 "	Doubtful.....	40 "	31 "
Distant.....	3 "	..	EPILEPTIC INSANITY:		
Absent.....	15 "	19 "	Tuberculosis in family:		
Doubtful.....	48 "	38 "	Near.....	28 "	57.5
MELANCHOLIA ACUTA:			Parents.....	5.5	..
Tuberculosis in family:			Distant.....	..	..
Near.....	35.5	65 "	Absent.....	22 "	..
Parents.....	14 "	23 "	Doubtful.....	50 "	43 "
Distant.....	7 "	6 "			

	Men.	Women.		Men.	Women.
GENERAL PARESIS:			DEMENTIA, TERMINAL:		
Tuberculosis in family:			Tuberculosis in family:		
Near	40 %	..	Near	23 %	44 %
Parents . . . . .	..	..	Parents	22 "	18 "
Distant . . . . .	..	..	Distant . . . . .	..	8 "
Absent	40 "	..	Absent	26 "	16 "
Doubtful	20 "	..	Doubtful	52 "	32 "
IMBECILITY:			THE TOTAL AVERAGE —		
Tuberculosis in family:			(including few miscellaneous cases):		
Near	36 "	40 %	Tuberculosis in family:		
Parents . . . . .	..	8 "	Near	32 %	47 %
Distant	9 "	..	Parents	9 "	17 "
Absent	36 "	20 "	Distant	2 "	6 "
Doubtful	18 "	40 "	Absent	25.5	17.5
			Doubtful	40.5	29.5

Is there necessary more than a glimpse at these figures to prove their importance? In men 34 and in women 53 per cent of tuberculosis in the family, and in the majority of cases in more than one member! Could such phenomenon be without its value — without a considerable value? And these high numbers bear no trace of exaggeration — rather the reverse. The occurrence of the disease in the families of the patients is, if anything, greater, because: (a) Whilst cases of the disease in the immediate relation are remembered well, those in remote are not known, perhaps not at all, or uncertainly, and such cases had to be included in the "absent" column. (b) In many cases there is more or less ignorance about the existence and whereabouts of the relatives, and consequently their fate is not known; in a few instances this ignorance included absolutely all the relatives — and these cases had to be classed with the "doubtful." (c) In some cases the knowledge of family history has been lost ever since the patient has been in the hospital, which might have been any period of the last ten years, and relatives might have succumbed to the disease in the meantime; some of these cases were classified with the absent (where the time was moderate), the rest with the doubtful. (d) Some of the relatives, who might have transmitted the trait already, and this produced its effects, may be still living and apparently well, and may later, or may not at all, succumb to consumption. (e) As only cases of pulmonary tuberculosis were inquired after, whilst the active disease presents many more types, which it would be impossible to ascertain, yet which can transmit the diathesis just as the pulmonary form, it is certain that many instances were omitted in this way.

The inheritance in the female predominates considerably over that in the male sex. It is a well-known fact that the direct hered-

ity of insanity is also greater in woman, and in somewhat similar relation of percentage—though I would not attach to this relation any specific importance. Both are due, no doubt, to the somewhat inferior resistance of the woman, and to the peculiarities of her mental and physical life. In the different forms of mental disease, if I may be permitted to still, for convenience, employ that ambiguous term, there is an accord between the two sexes only in mania recurrens, chronic melancholia, and imbecility; in all the other forms of alienation the “tare” in women predominates, though a due allowance must be made for the respective numbers examined. Considering all, the always (and especially with the insane) possible errors of information, and, again, the only too probable existence of positive cases among the doubtful, I think we can safely venture to state that some form of tuberculous heredity or other exists in from 40 to 50 per cent of male, and in from 55 to 60 per cent of female, insane patients. Shall we neglect, in our etiology of insanity, a factor of such a potency still further?

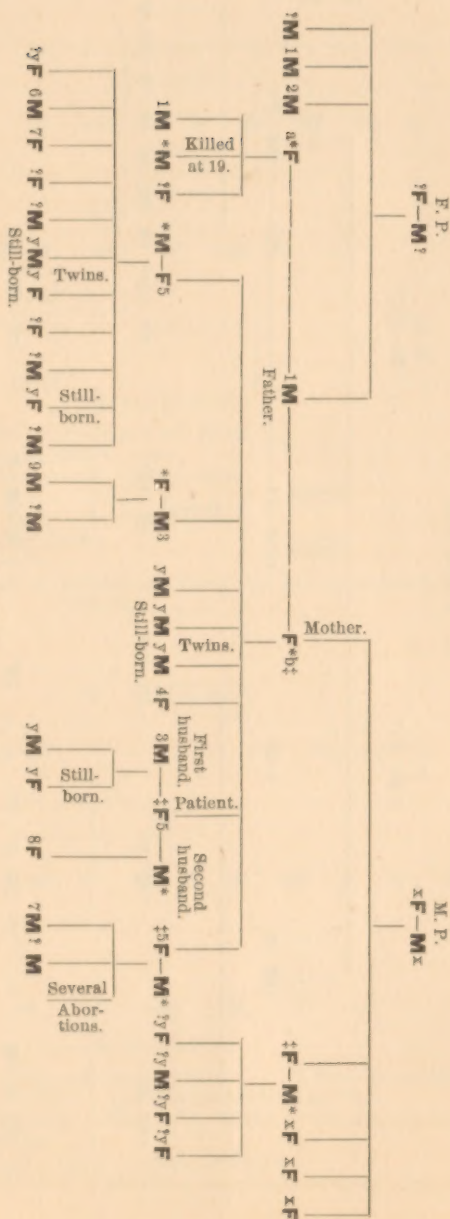
As a termination to my article, I beg to append several genealogical tables, taken at random. They will illustrate better than many words the degenerative conditions in some of the families of the patients.

II. DISORDERS OF SMELL IN THE INSANE.

Would someone ask me what relation the organs of smell bear to insanity, I should have to admit, to the full extent of the word, I do not know, just as I do not know exactly what relation any other organs of special sense can bear to the disease; nor have I found anyone else who knows or even pretends to do so. But, among twenty consecutive autopsies I made within the last two quarters of '94 and the first quarter of '95, I found five cases, or 25 per cent, where the olfactory nerves were in far advanced, or complete, states of degeneration, a fact which led me to the subsequent inquiries and examinations, the abstract of which is here presented. These autopsies were all made within twenty-four hours of death, so that the conditions found could not have been due to post-mortem changes.

It is remarkable how little attention the pathology of the olfactory nerve has yet received. Ziegler, in his great work on pathological anatomy (6 ed.), finds no place for this nerve, and the same is nearly true for Klebs, Green, and other general pathologists. Rosenthal and Groves make a few general remarks on it. The first observer says (Dis. of the Nerv. Syst., p. 187): “In insanity,

I. CASE 4311.



EXPLANATION.

F. P. Father's parents.

M. P. Mother's parents.

a Father's first wife.

b Father's second wife.

+ Twins.

1 Consumption—patient's father, half-brother, uncle.

2 Alcoholism—uncle.

3 Feeble constitution—own brother, husband.

4 Arthritis deformans; over-pious; death of "congestion of brain" at sixteen; own sister.

6 Arthritis, very feeble.

5 Insane—two own sisters; first mania, recovery; second paranoia; patient, paranoiac; exciting cause in all three, puerperium.

y Died young.

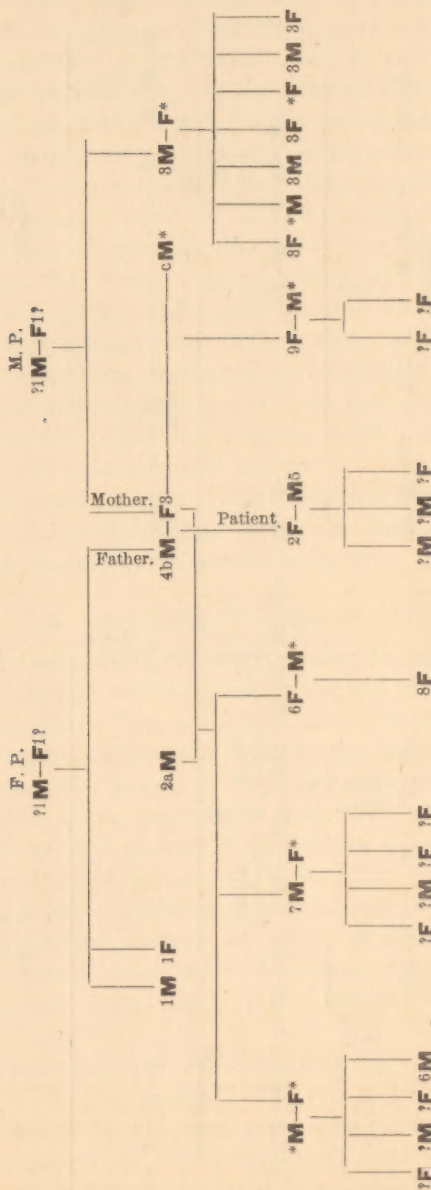
7 Precocious.

8 Hydrocephalus; torn from mother in pieces.

9 Rachitis.

* Healthy; several members genital; several very religious.

II. CASE 568.



EXPLANATION.

- 1 Dead, cause unknown.
2 Insane; the patient; paranoiac, and had a ves. calculus; musical; poetic.
3 Tuberculosis: mother, uncle, five first cousins. 4 Vesical calculus. 5 Cancer. 6 Constitution feeble.
7 "Peculiar" (mentally). 8 Subject to headaches; depressive. 9 Abscess of the brain, spontaneous.
a Mother's first husband. b Mother's second husband. c Mother's third husband.

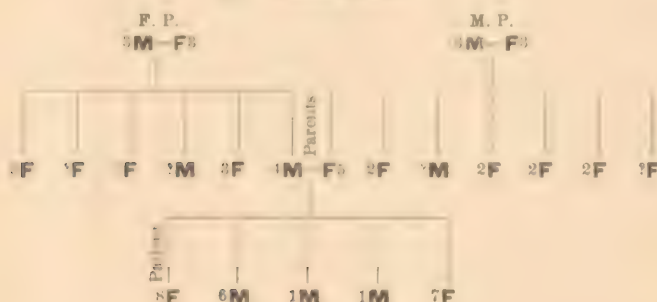
III. CASE 4171.



EXPLANATION.

- 1 Phthisis—Grandfather, two uncles, and two sisters.
- 2 Dysentery—Maternal grandfather; father.
- 3 Apoplexy (cerebral hæmorrhage)—mother, uncle.
- 4 Cause unknown.
- 5 Feeble constitution; death at first childbirth.
- 6 Marasmatic; death in two weeks.
- 7 Chronic digestive troubles.
- 8 The patient—spontaneous delirious excitement, followed by melancholia; debility; morphine habit acquired.
- 9 Healthy.

IV. CASE 2704.



EXPLANATION.

- 1 Normal.
- 2 Phthisis—mother, four sisters.
- 3 Dead; cause unknown.
- 4 Father died of Bright's disease; severe rheumatism for many years.
- 5 Mother always feeble; chronic bowel trouble; spontaneous cataract, both eyes.
- 6 Sister subject to neuralgia.
- 7 Brother had epilepsy up to twenty; chronic rheumatism.
- 8 The patient—hypocondriac melancholiac; congenitally deformed internal organs of generation).

in which subjective olfactory sensations exist, softening of the olfactory nerve, neoplasms of the base of the brain extending to the anterior lobe, softening or discoloration of the olfactory bulb, and adhesions of the olfactory nerves to the dura mater, have been discovered." Speaking of anosmia, he does not even mention its occurrence among the alienated. Gowers thinks (*Nerv. Dis.*, '88, p. 567) "anosmia is less frequently due to a lesion of the nerve than to disease of the mucous membrane of the nose, chronic inflammations, polypi, etc.," and, "in diseases of the cerebral hemispheres loss of smell is rare," and "functional loss occurs in hysterical hemianæsthesia" (568). Alienists like Tuke, Krafft-Ebing, Griesinger, Spitzka, Hammond, Ball, restrict themselves to the simple consideration of smell hallucinations. Erb (*Ziemsen's Enc.*, Vol. II, p. 262), acknowledges the existence of anosmia in the insane, but believes it "of central origin," and with similar results we may go from one investigator to another; and yet, direct examination on the living insane shows us a marked to an absolute anosmia in 30 per cent of the fair number of four hundred examined, and all these were yet the more recent and lighter cases of insanity.

The same two hundred of each sex were examined as in the first instance, and throughout, and hence were patients of enough intelligence to appreciate and respond to a feeling. Precautions were taken that each patient should know nothing of the nature of the examination before subjected to it. Cases of apparent nasal troubles or colds were avoided, or examined over. In many cases the deficiency found was acknowledged as having been observed already before by the patient himself.

The method of examination was as follows: Three test-tubes of a narrow caliber were taken and filled to about a half with (*a*) a 10 per cent solution of essence of peppermint in oil, (*b*) tincture of camphor, and (*c*) dilute ammonia. These test substances were not picked out entirely arbitrarily. They were chosen, first, as the most common and generally known flavors, and second, on account of the fact that many patients with a moderately dulled smell mistake one for the other, pronouncing ol. menthæ camphor and camphor ammonia. At about the upper end of the third-fourth of each test-tube (from below), a somewhat tightly fitting sponge-plug was placed; it served both as a preventive of spilling the contents, or some of the patients drinking them, and as a moderator of the odor.

Ol. menthæ, having the most transient effect on the olfactory nerve of the three substances chosen, was used first in testing, and was followed by camphor and then ammonia, and enough time and trials were afforded before a decision was formed as to the state of the sense; in consequence there can not be, however delicate be such an examination, much error.

The cases as found were divided into three classes, namely, the normal, or about so, the moderately dulled, and the much dulled to absent. As moderately dulled all those cases were classed which either had difficulty in recognizing the test substances, though familiar with them in general, or who would not recognize one or another at all. Positive anosmia is not easily decided. In many cases where the olfactory nerve is largely affected, the innervation of the fifth is normal or the sensibility of this nerve seems to be even increased, and stronger smells, especially ammonia, are recognized by this sensation and not the smell proper, and hence all such cases were, to avoid false conclusions, included with the considerably dulled under "dull to extinct." I would here again call attention to the fact that the four hundred examined represent practically the lighter cases, in which we would not expect the worst conditions.

Smell, where deficient, was found so in almost all the cases on both sides. No records of hyperæsthesia of the sense were made, and that for the following reasons: Hyperæsthesia of smell is in most its insane owners only subjective, or rather a pathological condition of the centers, and on examination of the organ really an opposite condition is found, that is more or less of anosmia. And there are forms of an intermediate state of affairs, I am sure, where, at the beginning of the degenerative process of the nerve, the condition is manifested as both, outwardly as dulling of the sense and inwardly as its hyperæsthesia. Of course we are absolutely unable to divide such different cases one from the other. True cases of hyperosmia, that is those not dependent on any organic changes, or at least any such of longer duration, are rare, are liable to be periodical, and occur mostly connected with hysteria.

The epileptics form an interesting class of their own; they have all a pronounced hyperæsthesia of the nasal branches of the trigeminus, whilst the olfactory in almost all is greatly dulled.

The following are the brief results of the examination; may they throw some light on one class of the obscure phenomena connected with disease of the mind:

	Men.	Women.		Men.	Women.
MANIA ACUTA:			PARANOIA—Continued.		
Smell: Normal....	37.5 %	57 %	Smell: Dull to ext..	35 %	22 %
Mod. dull.....	50 "	29 "	EPILEPTIC INSANITY:		
Dull to extinct..	12.5 "	14 "	Smell: Normal....	5.5 "	28.5 "
MANIA RECURRENT:			Mod. dull.....	22 "	14 "
Smell: Normal....	50 "	46 "	Dull to extinct..	72.5 "	57.5 "
Mod. dull.....	50 "	15.5 "	GENERAL PARESIS:		
Dull to extinct....		38.5 "	Smell: Normal....		
MANIA CHRONICA:			Mod. dull.....	40 "	
Smell: Normal....	37 "	48 "	Dull to extinct..	60 "	
Mod. dull.....	40 "	28 "	IMBECILITY:		
Dull to extinct..	23 "	24 "	Smell: Normal....	45 "	40 "
MELANCHOLIA ACUTA:			Mod. dull.....	18 "	60 "
Smell: Normal....	57 "	60 "	Dull to extinct..	36 "	
Mod. dull.....	21.5 "	23 "	DEMENTIA TERMINAL:		
Dull to extinct..	21.5 "	18 "	Smell: Normal....	28 "	32 "
MELANCHOLIA CHRONICA:			Mod. dull.....	40 "	20 "
Smell: Normal....	29 "	50 "	Dull to extinct..	32 "	48 "
Mod. dull.....	41 "	20 "	GENERAL AVERAGE (a few miscella-		
Dull to extinct..	29 "	32 "	neous cases included):		
PARANOIA:			Smell: Normal....	34 %	44.5 %
Smell: Normal....	40 "	43 "	Mod. dull.....	33 "	26.5 "
Mod. dull.....	25 "	35 "	Dull to extinct..	33 "	29 "

III. REFLEXES IN THE INSANE.

Insanity has, as yet, no concomitant pathology of the nervous system in general, with the exception, perhaps, of general paresis, and few specific disorders; nor do I think, with our present knowledge, any such can be formed. Nerve disorders are by no means unfrequent in mental disease, and may, in most instances, be proven to be due to it and dependent on it, but they are so variable in the same form of insanity, and again the same symptoms occur irregularly in so many forms of the disease, that we are unable to form, with regard to them, many definite conclusions.

Whenever the nervous system participates in any pathological process, be it substantially or sympathetically, the first affected are usually the parts controlled by the sympathetic; next come the special senses, then reflexes, and finally the voluntary nervous apparatus—gray nervous tissue first, white last. A year ago (Middl. State Hosp. Rep. for 1895, p. 174) I made quite an extended inquiry into the defects of sight and hearing in the insane; this year it were those of the smell, and then reflexes. Feeling and taste, the remaining two senses, although an effort has also been made to inquire into their condition, had to be omitted, on account of insurmountable difficulties such an examination presents with the insane. Suffice it to say in this place, that both these senses present, in this class of patients, many highly interesting and often unsuspected deviations from normal.

Irideal and patellar—the most important and decisive reflexes—were investigated only. In irideal both were examined, the light reflex and that of accommodation.

True nervous diseases existing outside, and probably before the insanity (a fact remarkably rare), were excluded. The results of the examinations are as follows:

MANIA ACUTA.				MELANCHOLIA ACUTA — Continued.			
	Men.	Women.			Men.	Women.	
Light:	Normal....75	% 57	%	Patellar: increased..21.5	% 12	%	%
	Diminished..12.5	" 43	"	Absent.....	"	"	"
	Absent.....12.5	" ..	"	MELANCHOLIA CHRONICA.			
Reflexes—Irideal:				Light:	Normal.....77	" 74	"
Accom'n:	Normal..62.5	" 57	"		Diminished..17	" 23	"
	Diminished..37.5	" 43	"		Absent.....6	" 3	"
	Absent.....	" ..	"	Reflexes—Irideal:			
Patellar:				Accom'n:	Normal..73	" 77	"
	Normal....25	" 29	"		Diminished..12	" 23	"
	Diminished..62.5	" 43	"		Absent.....6	" ..	"
	Increased....	29	"	Patellar:			
	Absent.....12.5	" ..	"		Normal.....29	" 44	"
MANIA RECURRENS.					Diminished..29	" 32	"
Light:	Normal....50	" 69	"		Increased....35	" 20	"
	Diminished..50	" 31	"		Absent.....6	" 3	"
	Absent.....	" ..	"	PARANOIA.			
Reflexes—Irideal:				Light:	Normal.....35	" 84	"
Accom'n:	Normal..50	" 84.5	"		Diminished..10	" 14	"
	Diminished..50	" 15.5	"		Absent.....5	" 2	"
	Absent.....	" ..	"	Reflexes—Irideal:			
Patellar:				Accom'n:	Normal..85	" 87	"
	Normal.....	15.5	"		Diminished..15	" 11	"
	Diminished..100	" 53.5	"		Absent.....	2	"
	Increased.....	31	"	Patellar:			
	Absent.....	" ..	"		Normal.....40	" 54	"
MANIA CHRONICA.					Diminished..25	" 22	"
Light:	Normal.....77	" 86	"		Increased....35	" 20	"
	Diminished..20	" 14	"		Absent.....	4	"
	Absent.....3	" ..	"	EPILEPTIC INSANITY.			
Reflexes—Irideal:				Light:	Normal....94.5	" 100	"
Accom'n:	Normal..68	" 95	"		Diminished..5.5	" ..	"
	Diminished..29	" 5	"		Absent.....	" ..	"
	Absent.....3	" ..	"	Reflexes—Irideal:			
Patellar:				Accom'n:	Normal..94.5	" 100	"
	Normal....55	" 53	"		Diminished..5.5	" ..	"
	Diminished..15	" 28	"		Absent.....	" ..	"
	Increased....29	" 14	"	Patellar:			
	Absent.....3	" 5	"		Normal....67	" 28	"
MELANCHOLIA ACUTA.					Diminished..22	" 43	"
Light:	Normal.....78.5	" 83	"		Increased....55	" 28	"
	Diminished..21.5	" 18	"		Absent.....5.5	" ..	"
	Absent.....	" ..	"	GENERAL PARESIS.			
Reflexes—Irideal:				Light:	Normal....60	" ..	"
Accom'n:	Normal..93	" 89	"		Diminished..40	" ..	"
	Diminished...7	" 12	"		Absent.....	" ..	"
	Absent.....	" ..	"	Reflexes—Irideal:			
Patellar:				Accom'n:	Normal..40	" ..	"
	Normal....43	" 65	"		Diminished..60	" ..	"
	Diminished..35.5	" 23	"		Absent.....	" ..	"

GENERAL PARESIS—Continued.				DEMENTIA, TERMINAL—Continued.			
		Men.	Women.			Men.	Women.
Patellar:				Reflexes—Irideal:			
	Normal	40	% ..	Accom'n: Normal..	68	% 88	%
	Diminished . . .		" ..	Diminished ..	20	" 32	"
	Increased	60		Absent			
	Absent			Patellar:			
	IMBECILITY.			Normal	46	" 56	"
Light:	Normal	91	" 60	Diminished ..	22	" 28	"
	Diminished . . .		" 40	Increased	26	" 16	"
	Absent			Absent	4	" ..	
Reflexes—Irideal:				GENERAL AVERAGE.			
	Accom'n: Normal.	100	" 80	(Few miscellaneous cases included.)			
	Diminished . . .		20	Light: Normal	79	% 79	%
	Absent			Diminished ..	18.5	" 19.5	"
Patellar:				Absent	2.5	" 1.5	"
	Normal	54	" 40	Reflexes—Irideal:			
	Diminished . . .	27	" 40	Accom'n: Normal..	77	" 84	"
	Increased	18	" 20	Diminished ..	21.5	" 15.5	"
	Absent			Absent	2.5	" .5	"
DEMENTIA, TERMINAL.				Patellar:			
Light:	Normal	76	" 88	Normal	47.5	" 48	"
	Diminished . . .	22	" 12	Diminished ..	25.5	" 30	"
	Absent			Increased	23.5	" 19.5	"
				Absent	3.5	" 2.5	"

There are several things of interest in the above numbers. The most striking is the great predominance of variations of patellar reflexes over those of the irideal (5-2). The second, the large number of cases where the patellar reflexes were increased (86 cases). And the third, which, however, is not seen from the table alone, is a very frequently found peculiar state of opposite conditions existing between the patellar reflex and that of accommodation; where this latter was diminished, the former, in a large majority of instances, was found more acute. The general truth is, that the conditions of the different reflexes very seldom correspond with each other, and that is true even as regards their irregularities.

IV. COLOR-BLINDNESS, ETC.

"The proportion of color-blind is about 5 per cent or less among men, and 2 per cent or less among women. This includes all the varieties and degrees of the defect." (Noyes: Disease of the Eye, p. 17.) Among the four hundred insane examined, color-blindness was found in only two men and one woman, which means, respectively, one and one-half of 1 per cent; and all these three cases were of an incomplete character.

The method of examination differed somewhat from those usual. Instead of using a skein or colored letters, solutions representing the seven rainbow colors were placed in narrow glass tubes, which were arranged in a frame of 3 x 4 inches. This method is

very simple, and I believe very efficacious. According to the inclination of the frame towards light, the tubes may be brought closer together, and where it seems necessary the light may be transmitted through the tubes and forms almost a perfect spectrum on a white paper behind, which adds to the instrument a further value. I must acknowledge the almost negative results of this examination surprised me, though even with such a number the possibility of accidents can not be excluded.

The last class of phenomena I inquired into is of a pure psychological order, and one of the most obscure; it comprises a few of purely psychical inclinations, as found in the insane patients.

It is commonly acknowledged that in every individual there is such a thing as a "nature;" a psychologist would state, every organization is slightly different from all others, and its psychical manifestations are correspondingly different; and both the layman and the scientist know that there are certain classes of these "natures." They are natural, or inborn, inclinations of faculties, and should not be mistaken for temperaments, which mean the ways of action and reaction of a being.

The inclinations of man's faculties consist mainly of (1) attraction toward an object, (2) indifference to it, or (3) aversion. Noticing these phenomena in the insane with relation to objects, both well defined and of common interest, I soon found some peculiarities that promised me that a closer and extended inquiry into the subject would not be without due compensation. I decided to choose the sciences preferred in schools—where the being is guided by the most natural, his virgin, inclinations, for it is these and not any that may have been acquired or modified by exigencies, duty or reason that are of true and prime psychological value. The investigation was conducted necessarily entirely by personal inquiry with each patient; the method pursued was to ascertain, first, if the examined had or had not a sufficient education; next, if he had sufficient, how he learned; and last, which of the various branches of learning he preferred most. Here are the results:

MANIA ACUTA—Subjects preferred in learning:				MANIA RECURRENS—Continued.			
	Men.	Women.		Men.	Women.		
Geography.	12.5 %	43 %		History.....	31 %		
History.....				Mathematics...50	%	31	"
Mathematics	12.5	"		None or misc....		7.5	"
None or misc ..	25	"		Too little school...		7.5	"
Too little school.	50	"		MANIA CHRONICA:			
MANIA RECURRENS:				Geography	15	"	14
Geography	50	"	23.5	History.....	15	"	14
				Mathematics...20	"	19	"

MANIA CHRONICA — Continued.

	Men.	Women.
None or misc.	34 %	33 %
Too little school. 17	" 24	" "
MELANCHOLIA ACUTA:		
Geography	7	18
History	21.5	50
Mathematics.	35.5	18
None or misc.	14	12
Too little school. 21.5	" 6	" "
MELANCHOLIA CHRONICA:		
Geography	6	26
History	6	26
Mathematics.	23	"
None or misc.	41	26
Too little school. 23	" 20	" "
PARANOIA:		
Geography	25	16
History	10	31
Mathematics.	35	7
None or misc.	25	31
Too little school. 5	" 13	" "
EPILEPTIC INSANITY:		
Geography	"	"
History	"	"
Mathematics.	61	14
None or misc.	22	57.5

EPILEPTIC INSANITY — Continued.

	Men.	Women.
Too little school. 17	17 %	28.5 %
IMBECILITY:		
Geography.	27	"
History.	"	10
Mathematics.	18	35
None or misc.	45	55
Too little school. 9	"	"
GENERAL PARESIS:		
Geography.	"	"
History.	"	"
Mathematics.	80	"
None or misc.	"	"
Too little school 20	"	"
TERMINAL DEMENTIA:		
Geography.	12	8
Mathematics	10	8
History.	22	4
None or misc.	44	60
Too little school. 12	" 20	" "
GENERAL AVERAGE:		
Geography.	13.5	14.5
History.	9.5	22.5
Mathematics.	28.5	17.5
None or misc.	32.5	27.5
Too little school. 16	" 17	" "

Several very apparent deductions can be drawn from the tables:

History (and abstract sciences) is much more favored by women, and especially by the female melancholiac and paranoiac. Mathematics forms almost an exclusive preference with the epileptics and in general paresis. Most indifferent and illiterate are among the terminal dementes.

Strong musical inclination is very prevalent (23 per cent) among female and slightly less among the male paranoiacs; but many of these insane soon lose the best of their qualities of composing, playing, and singing.

Artistic tendency is very pronounced, and almost general, in several species of insanity (viz., Lombroso, *Genie*, p. 284); it is common with paranoiacs. I have several pictures made by paranoiacs, and that in some instances almost untrained ones, that are worth looking at, at least; and the local journal of the Middletown State Hospital bears many a trace of "insane" inspiration that is worth a perusal. I regret the extent of my article prohibits me from introducing a few examples, and speaking of this interesting subject more in detail. * * * *

I conclude: I have tried to do my work sincerely; may it be thus accepted. And I extend herewith my thanks and gratitude to the authorities of the Middletown State Hospital for the Insane, by whose courtesy I have been enabled to make these investigations.